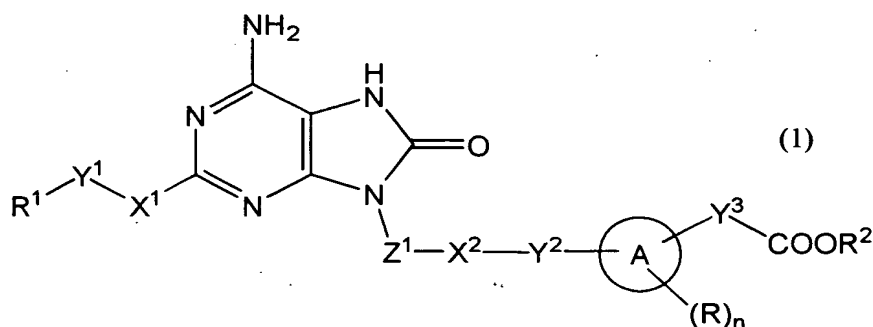


CLAIMS

1. An 8-oxoadenine compound shown by the formula (1):



wherein ring A represents a 6-10 membered aromatic carbocyclic ring or a 5-10 membered heteroaromatic ring;

R represents a halogen atom, an alkyl group, a hydroxyalkyl group, a haloalkyl group, an alkoxy group, a hydroxyalkoxy group, a haloalkoxy group, amino group, an alkylamino group, a dialkylamino group, or a cyclic amino group;

n represents an integer of 0-2, and when n is 2, the Rs may be the same or different;

Z¹ represents a substituted or unsubstituted alkylene group or a substituted or unsubstituted cycloalkylene group;

X² represents oxygen atom, sulfur atom, SO₂, NR⁵, CO, CONR⁵, NR⁵CO, SO₂NR⁵, NR⁵SO₂, NR⁵CONR⁶ or NR⁵CSNR⁶ (in which R⁵ and R⁶ are each independently hydrogen atom, a substituted or unsubstituted alkyl group, and a substituted or unsubstituted cycloalkyl group);

Y¹, Y² and Y³ represent each independently a single bond or an alkylene group;

X¹ represents oxygen atom, sulfur atom, SO₂, NR⁴ (wherein R⁴ is hydrogen atom or an alkyl group) or a single bond;

R² represents hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group, a substituted or unsubstituted alkynyl group or a substituted or unsubstituted cycloalkyl group; and

R¹ represents hydrogen atom, hydroxy group, an alkoxy group, an alkoxycarbonyl group, a haloalkyl group, a haloalkoxy group, a substituted or unsubstituted aryl group, a substituted or unsubstituted heteroaryl

group or a substituted or unsubstituted cycloalkyl group,
or its pharmaceutically acceptable salt.

2. The 8-oxoadenine compound according to claim 1, wherein ring A
represents a 6-10 membered aromatic carbocyclic ring, or a 5-10
5 membered heteroaromatic ring containing 1-4 hetero atoms selected from
0-4 nitrogen atoms, 0-2 oxygen atoms and 0-2 sulfur atoms;

R represents a halogen atom, an alkyl group of 1-6 carbons, a hydroxyalkyl
group of 1-6 carbons, a haloalkyl group of 1-6 carbons, an alkoxy group of
1-6 carbons, a hydroxyalkoxy group of 1-6 carbons, a haloalkoxy group of
10 1-6 carbons, amino group, an alkylamino group of 1-6 carbons, a
dialkylamino group in which each alkyl moiety has 1-6 carbons, and a
cyclic amino group;

n is an integer of 0-2, and when n is 2, Rs may be the same or different;

Z¹ represents an alkylene group of 1-6 carbons or a cycloalkylene group of
15 3-8 carbons, which is optionally substituted by hydroxy group;

X² represents oxygen atom, sulfur atom, SO₂, NR⁵, CO, CONR⁵, NR⁵CO,
SO₂NR⁵, NR⁵SO₂, NR⁵CONR⁶ or NR⁵CSNR⁶ (in which R⁵ and R⁶ are
independently hydrogen atom, a substituted or unsubstituted alkyl group
of 1-6 carbons, and a substituted or unsubstituted cycloalkyl group of 3-8
20 carbons, wherein the substituents of the alkyl group or cycloalkyl group
are selected from a halogen atom, hydroxy group, an alkoxy group of 1-6
carbons, carboxy group, an alkoxycarbonyl group of 2-5 carbons,
carbamoyl group, amino group, an alkylamino group of 1-6 carbons, an
dialkylamino group in which each alkyl moiety has 1-6 carbons, a cyclic
25 amino group, carboxy group and tetrazolyl group which may be substituted
by an alkyl group of 1-6 carbons.);

Y¹, Y² and Y³ represent each independently a single bond or an alkylene
group of 1-6 carbons;

X¹ represents oxygen atom, sulfur atom, SO₂, NR⁴ (wherein R⁴ represents
30 hydrogen atom or an alkyl group) or a single bond;

R² represents a substituted or unsubstituted alkyl group of 1-6 carbons, a
substituted or unsubstituted alkenyl group of 2-6 carbons, a substituted
or unsubstituted alkynyl group of 2-6 carbons or a substituted or
unsubstituted cycloalkyl group of 3-8 carbons (wherein the substituent in
the alkyl group, alkenyl group and alkynyl group is selected from a halogen
35 atom, hydroxy group, an alkoxy group of 1-6 carbons, an acyloxy group of

2-10 carbons, amino group, an alkylamino group of 1-6 carbons, a dialkylamino group in which the each alkyl moiety has 1-6 carbons, and a cyclic amino group); and

R^1 represents hydrogen atom, hydroxy group, an alkoxy group of 1-6 carbons, an alkoxycarbonyl group of 2-5 carbons, a haloalkyl group of 1-6 carbons, a haloalkoxy group of 1-6 carbons, a substituted or unsubstituted aryl group of 6-10 carbons, a substituted or unsubstituted 5-10 membered heteroaryl group containing 1-4 hetero atoms selected from 0-4 nitrogen atoms, 0-2 oxygen atoms and 0-2 sulfur atoms, or a substituted or unsubstituted cycloalkyl group of 3-8 carbons;

and the said substituent in the aryl group, the heteroaryl group and the cycloalkyl group is selected from a halogen atom, hydroxy group, an alkyl group of 1-6 carbons, a haloalkyl group of 1-6 carbons, an alkoxy group of 1-6 carbons, a haloalkoxy group of 1-6 carbons, an alkylcarbonyl group of 2-5 carbons, amino group, an alkylamino group of 1-6 carbons and a dialkylamino group (wherein the each alkyl group has 1-6 carbons), and the said cyclic amino group represents a 4-7 membered saturated cyclic amino group containing 1-2 hetero atoms selected from 1-2 nitrogen atoms, 0-1 oxygen atom and 0-1 sulfur atom, which may be substituted with a halogen atom, hydroxy group, oxo group, an alkyl group of 1-6 carbons, an alkoxy group of 1-6 carbons, an alkylcarbonyl group of 2-5 carbons or an alkoxycarbonyl group of 2-5 carbons, in the formula (1) of the calim 1,

or its pharmaceutically acceptable salt.

3. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to claim 1 or 2, wherein X^2 in the formula (1) of the calim 1 is oxygen atom, sulfur atom, NR^5 , SO_2 , NR^5SO_2 or NR^5CONR^6 .

4. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to any of claims 1-3, wherein Y^3 in the formula (1) of the calim 1 is a single bond, methylene or ethylene.

5. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to any of claims 1 to 4, wherein Z^1 in the formula (1) of the calim 1 is a straight chained alkyl group of 1-6 carbons which may be substituted with hydroxy group.

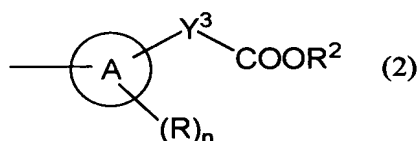
6. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to any of claims 1-5, wherein X^1 in the formula (1) of the

calim 1 is oxygen atom or sulfur atom.

7. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to any of claims 1-6, wherein Y^1 in the formula (1) of the calim 1 is a single bond or an alkylene group of 1-6 carbons.

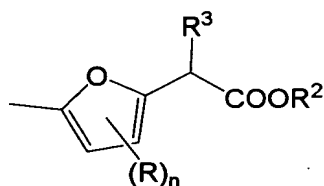
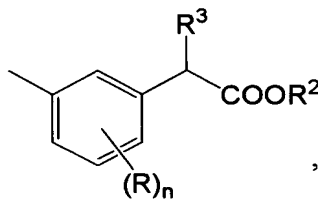
5 8. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to any of claims 1-7, wherein R^1 in the formula (1) of the calim 1 is hydrogen atom, an alkoxycarbonyl group, hydroxy group, or an alkoxy group.

10 9. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to any of claims 1-8, wherein a group shown by the formula (2) in the formula (1) of the calim 1:



(wherein ring A, R, n, Y^3 and R^2 have the same meaning as in the formula (1))

15 is a group shown by the formula (3) or the formula (4):



(wherein R, n and R^2 have the same meaning as in the formula (1), and R^3 is hydrogen atom or an alkyl group).

20 10. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to claim 9, wherein R^2 is methyl group or an alkyl group of 2-6 carbons substituted by a dialkylamino group or a cyclic amino group.

11. The 8-oxoadenine compound or its pharmaceutically acceptable salt according to claim 9 or 10, wherein R^3 is hydrogen atom.

25 12. A pharmaceutical composition comprising the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 as an active ingredient.

13. An immuno-modulator comprising the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 as an

active ingredient.

14. A therapeutic or prophylactic agent for viral diseases, cancers or allergic diseases comprising the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 as an active ingredient.

15. A medicament for topical administration comprising the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 as an active ingredient.

16. A use of the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 as a medicament.

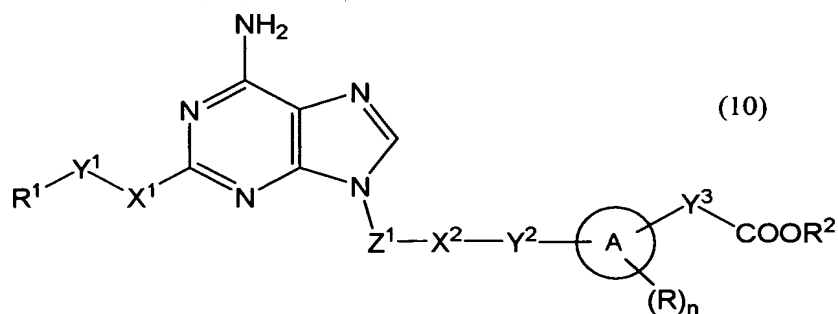
17. A use of the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 for manufacturing an immuno-modulator.

18. A use of the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11 for manufacturing a therapeutic or prophylactic agent for viral diseases, cancers and allergic diseases.

19. A method for modulating immune response which comprises administering to a patient, an effective amount of the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11.

20. A method for treating or preventing viral diseases, cancers and allergic diseases which comprises administering to a patient, an effective amount of the 8-oxoadenine compound or its pharmaceutically acceptable salt as claimed in any of claims 1-11.

21. A process for preparing the 8-oxoadenine compound as claimed in any of claims 1-11 which comprises brominating a compound shown by the formula (10):

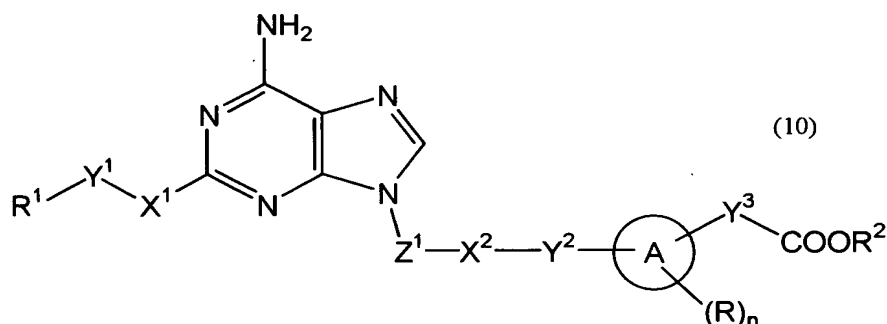


wherein ring A, n, R, R¹, R², X¹, X², Y¹, Y², Y³ and Z¹ are the same

defined in the claim 1,

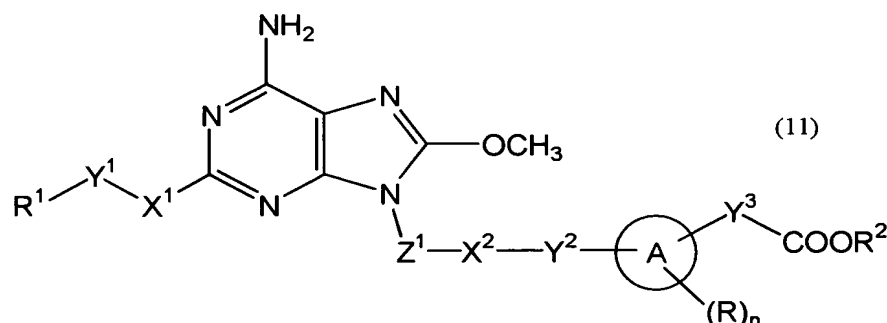
reacting the resultant with a metal alkoxide and then hydrolyzing, or hydrolyzing the resultant.

22. A compound shown by the formula (10):



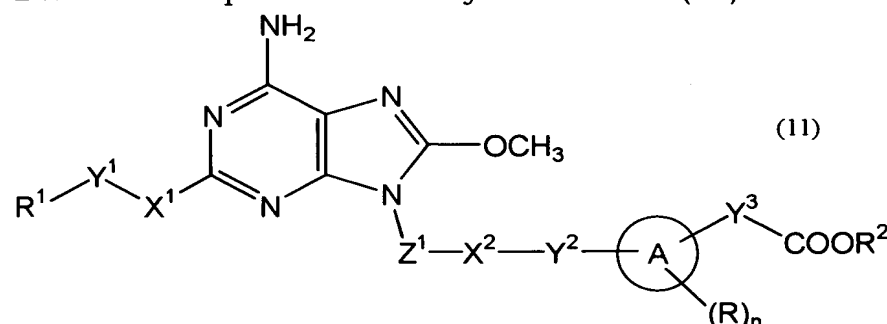
wherein ring A, n, R, R¹, R², X¹, X², Y¹, Y², Y³ and Z¹ are the same defined in the claim 1.

23. A process for preparing the 8-oxoadenine compound as described in any of claim 1-11 which comprises deprotecting a compound shown by the formula (11):



wherein ring A, n, R, R¹, R², X¹, X², Y¹, Y², Y³ and Z¹ are the same defined in the claim 1.

24. A compound shown by the formula (11):



wherein ring A, n, R, R¹, R², X¹, X², Y¹, Y², Y³ and Z¹ are the same

defined in the claim 1.

25. A compound or a pharmaceutically acceptable salt thereof selected from the group consisting of the following compounds:

2-Butoxy-8-oxo-9-[2-(3-methoxycarbonylphenoxy)ethyl]adenine,
 2-Butoxy-8-oxo-9-[2-(3-methoxycarbonylmethylphenoxy)ethyl]adenine,
 2-Butoxy-8-oxo-9-[2-(2-methoxycarbonylphenoxy)ethyl]adenine,
 2-Butoxy-8-oxo-9-[2-(2-methoxycarbonylmethylphenoxy)ethyl]adenine,
 2-Butoxy-8-oxo-9-[2-(4-methoxycarbonylphenoxy)ethyl]adenine,
 2-Butoxy-8-oxo-9-[2-(4-methoxycarbonylmethylphenoxy)ethyl]adenine,
 2-Butoxy-8-oxo-9-[2-[4-(2-methoxycarbonylethyl)phenoxy]ethyl]adenine,
 2-Butoxy-8-oxo-9-[4-(3-methoxycarbonylbenzenesulfonamide)butyl]adenine,
 2-Butoxy-8-oxo-9-[4-(3-methoxycarbonylmethylbenzenesulfonamide)butyl]adenine,
 2-Butoxy-8-oxo-9-[4-(3-methoxycarbonylphenylaminocarbonylamino)butyl]adenine,
 2-Butoxy-8-oxo-9-[4-(3-methoxycarbonylmethylphenylaminocarbonylamino)butyl]adenine,
 Methyl [3-({2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethyl}amino)methyl]phenyl]acetate,
 [3-({2-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethyl}amino)methyl]phenyl]acetic acid,
 Methyl 3-({3-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)propyl}amino)methyl]benzoate,
 3-({3-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)propyl}amino)methyl]benzoic acid,
 Methyl 4-({3-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)propyl}amino)methyl]benzoate,
 4-({3-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)propyl}amino)methyl]benzoic acid,
 Methyl (3-({3-(6-amino-2-butoxy-8-oxo-9H-purin-9-yl)propyl}(2-morpholin-4-ylethyl)amino)methyl]phenyl]acetate,
 Methyl [3-({4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl}amino)methyl]phenyl]acetate,
 Ethyl 2-[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethoxy]benzoate,

- 3-(Dimethylamino)propyl 2-[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethoxy]benzoate,
Methyl 3-[4-({[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]amino)sulfonyl}phenyl]propanoate,
5 3-[4-({[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]amino)sulfonyl}phenyl]propanoic acid,
Methyl (3-{{[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]}(2-pyrrolidin-1-ylethyl)amino)sulfonyl}phenyl)acetate,
(3-{{[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]}(2-pyrrolidin-1-ylethyl)amino)sulfonyl}phenyl)acetic acid,
10 Methyl (3-{{[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]}(2-methoxyethyl)amino)sulfonyl}phenyl)acetate,
(3-{{[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]}(2-methoxyethyl)amino)sulfonyl}phenyl)acetic acid,
15 Methyl (3-{{[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]}(methyl)amino)sulfonyl}phenyl)acetate,
(3-{{[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]}(methyl)amino)sulfonyl}phenyl)acetic acid,
Methyl [3-({[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]}[3-(dimethylamino)-2,2-dimethylpropyl]amino)sulfonyl}phenyl)acetate,
20 [3-({[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]}[3-(dimethylamino)-2,2-dimethylpropyl]amino)sulfonyl}phenyl)acetic acid,
Methyl [3-({[3-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)propyl]amino)sulfonyl}phenyl)acetate,
25 Methyl (3-{{[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]}(2-hydroxy-2-methylpropyl)amino)sulfonyl}phenyl)acetate,
(3-{{[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]}(2-hydroxy-2-methylpropyl)amino)sulfonyl}phenyl)acetic acid,
Methyl [3-({[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethyl]amino)sulfonyl}phenyl)acetate,
30 Methyl [3-({[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]}[(2R)-2,3-dihydroxypropyl]amino)sulfonyl}phenyl)acetate,
[3-({[4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]}[(2R)-2,3-dihydroxypropyl]amino)sulfonyl}phenyl)acetic acid,
35 Methyl 3-({[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl]}[3-(dimethylamino)-2,2-dimethylpropyl]amino)sulfonyl)benzoate,

- 3-([4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][3-(dimethylamino)-2,2-dimethylpropyl]amino)sulfonyl)benzoic acid,
Methyl (3-([4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl](3-morpholin-4-ylpropyl)amino)methyl)phenyl)acetate,
5 (3-([4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl](3-morpholin-4-ylpropyl)amino)methyl)phenyl)acetic acid,
Methyl [3-([4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][3-(dimethylamino)-2,2-dimethylpropyl]amino)methyl]phenyl)acetate,
10 [3-([4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][3-(dimethylamino)-2,2-dimethylpropyl]amino)methyl]phenyl)acetic acid,
Methyl [3-([4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][3-(2-oxopyrrolidin-1-yl)propyl]amino)methyl]phenyl)acetate,
[3-([4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][3-(2-oxopyrrolidin-1-yl)propyl]amino)methyl]phenyl)acetic acid,
15 Methyl (3-([4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl](2-morpholin-4-ylethyl)amino)methyl)phenyl)acetate,
(3-([4-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl](2-morpholin-4-ylethyl)amino)methyl)phenyl)acetic acid,
Methyl (3-([3-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)propyl](3-morpholin-4-ylpropyl)amino)methyl)phenyl)acetate,
20 Methyl [3-([4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl][2-(1H-tetrazol-5-yl)ethyl]amino)methyl]phenyl)acetate,
Methyl (3-([2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethyl]thio)phenyl)acetate,
25 (3-([2-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethyl]thio)phenyl)acetic acid,
Methyl (3-([2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethyl]amino)phenyl)acetate,
Methyl (3-([3-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)propyl]amino)phenyl)acetate,
30 (3-([3-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)propyl]amino)phenyl)acetic acid,
Methyl [3-([3-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)propyl]amino)methyl]phenyl)acetate,
35 ([3-([3-(6-Amino-2-butoxy-8-methoxy-9H-purin-9-yl)propyl]amino)methyl]phenyl)acetic acid,

- Methyl (3-[[[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethyl](2-methoxyethyl)amino]methyl}phenyl)acetate,
 (3-[[[2-(6-Amino-2-butoxy-8-methoxy-9H-purin-9-yl)ethyl](2-methoxyethyl)amino]methyl}phenyl)acetic acid,
- 5 Methyl (3-[[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethyl]sulfonyl}phenyl)acetate,
 Methyl (3-[[[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethyl](methyl)amino]methyl}phenyl)acetate,
 (3-[[[2-(6-Amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethyl](methyl)amino]methyl}phenyl)acetic acid,
- 10 Methyl 4-[3-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)-2-hydroxypropoxy]benzoate,
 Methyl (3-[[[2-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)ethyl](2-hydroxyethyl)amino]methyl}phenyl)acetate,
- 15 Methyl (3-[[[4-(6-amino-2-butoxy-8-oxo-7,8-dihydro-9H-purin-9-yl)butyl](2-hydroxyethyl)amino]methyl}phenyl)acetate,
 2-Butoxy-8-oxo-9-[2-(3-hydroxycarbonylphenoxy)ethyl]adenine,
 2-Butoxy-8-oxo-9-[2-(3-hydroxycarbonylmethylphenoxy)ethyl]adenine,
 2-Butoxy-8-oxo-9-[2-(2-methoxycarbonylphenoxy)ethyl]adenine,
- 20 2-Butoxy-8-oxo-9-[2-(2-hydroxycarbonylmethylphenoxy)ethyl]adenine,
 2-Butoxy-8-oxo-9-[2-(4-hydroxycarbonylphenoxy)ethyl]adenine,
 2-Butoxy-8-oxo-9-[2-(4-methoxycarbonylmethylphenoxy)ethyl]adenine,
 2-Butoxy-8-oxo-9-[2-[4-(2-hydroxycarbonylolethyl)phenoxy]ethyl]adenine,
 2-Butoxy-8-oxo-9-[4-(3-hydroxycarbonylbenzenesulfonamide)butyl]adenine,
- 25 2-Butoxy-8-oxo-9-[4-(3-hydroxycarbonylmethylbenzenesulfonamide)butyl]adenine,
 2-Butoxy-8-oxo-9-[4-(3-hydroxycarbonylphenylaminocarbonylamino)butyl]adenine and
 2-Butoxy-8-oxo-9-[4-(3-hydroxycarbonylmethylphenylaminocarbonylamino)butyl]adenine.
- 30